

CLAIMS

1. A semiconductor material comprising a bipolar transistor structure having a collector layer, a base layer and an emitter layer, characterized by the provision of a hole barrier layer for preventing diffusion of holes having the effect of lowering band elevation by electrons accumulated in the collector layer when the collector current density increases, maintaining band elevation.

2. A semiconductor material according to claim 1, wherein the additional layer is an InGaAs layer.

3. A semiconductor material according to claim 1, wherein the additional layer is a layer doped with up to  $1 \times 10^{18} \text{cm}^{-2}$  p-type dopant.

4. A semiconductor material comprising a bipolar transistor structure having a collector layer, a base layer and an emitter layer, characterized by the provision of a hole barrier layer in the collector layer for maintaining band elevation by electrons accumulated in the collector layer when the collector current density increases by preventing diffusion of holes having the effect of lowering band elevation.

5. A semiconductor material according to claim 4, having a layer doped by p-type dopant between the hole barrier layer and the base layer.

6. A semiconductor material according to claim 4 or 5, manufactured using a chemical compound semiconductor substrate, wherein the material of the collector layer is GaAs or InGaAs, and the material of the hole barrier layer is any from among InGaP, InGaAsP, InGaAs,  $p^+$ -GaAs, GaAs and  $p^+$ -InGaAs.

7. A semiconductor material according to claim 4, wherein the material of the hole barrier layer is InGaP having an In composition of not less than 0.6.

8. A semiconductor material according to claim 1, wherein a hole barrier layer for preventing diffusion of holes is provided between the additional layer and the base layer.

9. A semiconductor device manufactured using semiconductor material according to any of claims 1 to 8.